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2 UNITED STATES PATENT AND TRADEMARK OFFICE
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4
5 BEFORE THE BOARD OF PATENT APPEALS
6 AND INTERFERENCES
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9 *Ex parte* FUSASUKE GOTOH,
10 HIROSHI ISHIGURO,
11 NAOKI FUKUDA,
12 and
13 TOSHIHISA OHATA
14

15
16 Appeal No. 2006-2829
17 Application No. 09/925,020
18 Technology Center 3600
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21 Decided: November 9, 2007
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23

24 Before WILLIAM F. PATE, III, TERRY J. OWENS, and JENNIFER D. BAHR,
25 *Administrative Patent Judges.*

26
27 OWENS, *Administrative Patent Judge.*
28

29
30 DECISION ON APPEAL

31 The Appellants appeal from a rejection of claims 1-18, which are all of the
32 pending claims.

1 THE INVENTION

2 The Appellants claim a roller bearing. Claim 1 is illustrative:

3 1. A rolling bearing apparatus comprising:
4 a roller bearing including
5 a plurality of rolling elements held between an inner ring and an
6 outer ring by a retainer, and
7 grease sealed in said rolling bearing by a seal;
8 a rotary body provided with said outer ring; and
9 a shaft provided with said inner ring, wherein said rolling bearing
10 apparatus is configured such that said rotary body and said shaft are
11 connected together by a clutch mechanism,
12 when said rotary body and said shaft are connected, said rolling
13 bearing can be used on receiving a rotation load, while the reactive rotation
14 between said inner and outer rings is zero, and
15 wherein an initial radial clearance between said inner and outer rings
16 is set such that a bearing effective clearance when said rolling bearing is
17 incorporated between said rotary body and said shaft can provide a positive
18 value.
19

20 THE REFERENCES

21Brucher	US 4,371,220	Feb. 1, 1983
22Teramachi	US 4,629,337	Dec. 16, 1986
23Dreschmann	US 4,650,195	Mar. 17, 1987
24Takano	US 5,655,844	Aug. 12, 1997
25Tanaka ¹	US 6,170,625 B1	Jan. 9, 2001
26Iso	US 6,329,326 B1	Dec. 11, 2001
27		(filed Sep. 28, 1999)
28		

29 THE REJECTIONS

4¹ The Examiner relies upon Tanaka as an English equivalent of JP 11-22753, and
5Iso as an English equivalent of JP 2000-119673 (final rejection mailed June 10,
62005, p. 2). Because the Examiner cites to Tanaka and Iso and the Appellants do
7not object to those substitutions, we consider Tanaka and Iso to be the references
8relied upon by the Examiner in the rejections.

1 The claims stand rejected under 35 U.S.C. § 103 as follows: claims 1, 9, 17
2and 18 over Tanaka in view of Iso and Takano; claims 2 and 10 over Tanaka in
3view of Iso, Takano and Brucher; claims 3 and 11 over Tanaka in view of Iso,
4Takano and Teramachi; claims 4 and 12 over Tanaka in view of Iso, Takano,
5Brucher and Teramachi; claims 5 and 13 over Tanaka in view of Iso, Takano and
6Dreschmann; claims 6 and 14 over Tanaka in view of Iso, Takano, Bucher and
7Dreschmann; claims 7 and 15 over Tanaka in view of Iso, Takano, Teramachi and
8Dreschmann; and claims 8 and 16 over Tanaka in view of Iso, Takano, Brucher,
9Teramachi and Dreschmann.

10 OPINION

11 We reverse the rejection of claims 17 and 18 and affirm the rejections of the
12other claims.

13 Claims 1-16

14 The Appellants provide a substantive argument only with respect to claim 1,
15which is the sole independent claim (Br. 10-13; Reply Br. 4-5). Although
16additional references are applied to claims 2-8 and 10-16, the Appellants do not
17argue the separate patentability of those claims (Br. 15-16). We therefore limit our
18discussion of claims 1-16 to claim 1. *See* 37 C.F.R. § 41.37(c)(1)(vii)(2004).

19 Tanaka discloses a pulley unit that has a clutch and can be installed on an
20auxiliary machine such as an air conditioner compressor, a water pump, an
21alternator or a cooling fan, driven from a crankshaft of an engine of an automobile
22or the like through a belt (col. 1, ll. 7-12). The pulley unit comprises a roller
23bearing (4) including balls (18) between an inner ring (16) and an outer ring (17), a
24lubricant retained in the roller bearing by an oil seal (20), a rotary outer ring (1)
25around which a belt (B) is wrapped, and an inner ring (2) attached to a shaft (not

1numbered) (col. 3, ll. 21-34, 64-67; fig. 1). When the clutch is in a lock state the
2outer (1) and inner (2) rings rotate synchronously with each other (col. 4, ll. 7-10).

3 Iso discloses a roller bearing filled with a grease containing as base oils a
4perfluoropolyether oil having a straight-chain structure and a dynamic viscosity of
540-160 mm²/s and a particulate fluoro-resin, and containing, as a thickening agent, a
6particulate polytetrafluoroethylene (abstract).

7 Takano discloses a roller bearing unit used, for example, for rotatably
8supporting a rotating shaft of a screw compressor (col. 1, ll. 6-8). Takano teaches
9(col. 2, ll. 24-36):

10 [T]here have heretofore been various attempts to extend the life of the
11 rolling bearing unit fitted for example to a screw compressor. A first
12 arrangement has been carried out wherein a positive gap or actual gap (in
13 contrast to a negative gap under preload conditions) is provided rather than a
14 preload being applied to the pair of ball bearings of the rolling bearing unit.
15 When a positive or actual gap is provided in this way, then the contact
16 pressure on the rolling faces of the balls and on the inner and outer raceways
17 of the respective ball bearings is smaller than that for the case of a preload
18 applied, so that the fatigue life of the rolling faces, as well as that of the
19 inner and outer ring raceways is improved.
20

21Takano discloses, with respect to his invention, a ball bearing (5) having an
22assembly axial gap of 0.010 mm which provides a positive gap for the ball bearing
23(col. 7, ll. 40-41).

24 The Appellants argue that there would have been no motivation to combine
25Tanaka and Takano because unlike Tanaka, Takano is nonanalogous art (Br. 12-
2613). The test urged by Appellants of whether a reference is from an analogous art
27is first, whether it is within the field of the inventor's endeavor, and second, if it is
28not, whether it is reasonably pertinent to the particular problem with which the
29inventor was involved. *See In re Wood*, 599 F.2d 1032, 1036, 202 USPQ 171, 174

1(CCPA 1979). A reference is reasonably pertinent if, even though it may be in a
2different field of endeavor, it is one which, because of the matter with which it
3deals, logically would have commended itself to an inventor's attention in
4considering the inventor's problem. *See In re Clay*, 966 F.2d 656, 659, 23
5USPQ2d 1058, 1061 (Fed. Cir. 1992). The Appellants argue, regarding the first
6prong of the test, that their field of endeavor is rotary elements that may be held
7together by clutches, whereas Takano's field of endeavor is screw extruders
8(actually, screw compressors) (Br. 12). The Appellants argue that, unlike their
9rotary elements, screw extruder roller bearings have inner and outer rings that do
10not rotate together such that there is no relative movement between them, and must
11support an axial load acting against the turns of the screw portion of the extruder
12(Br. 12; Reply Br. 4). The Appellants argue, with respect to the second prong of
13the test (Br. 13):

14 Takano does not teach or suggest that there is solved the problem of wear in
15 a rolling bearing used on the condition that the rolling bearing receives a
16 rotation load, while a relative rotation between the inner ring and the outer
17 ring is zero, as is the situation in a mechanism having a clutch; i.e., the
18 problem solved by the present invention.
19

20The Supreme Court's statement in *KSR Int'l. Co. v. Teleflex Inc.*, 127 S.Ct. 1727,
211740, 82 USPQ2d 1385, 1396 (2007) that "[w]hen a work is available in one field
22of endeavor, design incentives and other market forces can prompt variations of it,
23either in the same field or a different one" indicates that for prior art to be properly
24applied in a rejection it need not satisfy the first prong of the nonanalogous art test.
25The Supreme Court also stated in *KSR* that "the problem motivating the patentee
26may be only one of many addressed by the patent's subject matter. The question is
27not whether the combination was obvious to the patentee but whether the

1combination was obvious to a person with ordinary skill in the art.” *KSR*, 127
2S.Ct. at 1742, 82 USPQ2d at 1397. Those statements indicate that for prior art to
3be properly applied in a rejection it need not satisfy the second prong of the
4nonanalogous art test as articulated in *Wood* and *Clay*. Hence, the Appellants’
5argument that Takano is nonanalogous art is not well taken. Regardless, because
6Takano pertains to using a gap to improve the fatigue life of roller bearings, it 1)
7logically would have commended itself to the Appellant’s attention in considering
8their problem of roller bearing wear and, therefore, is in the Appellant’s field of
9endeavor, and 2) is reasonably pertinent to the problem of roller bearing wear with
10which the Appellants were involved. Takano, therefore, is analogous art.

11 Moreover, Takano’s disclosure that the positive gap was used “for example”
12in screw compressor roller bearings (col. 2, ll. 24-26) would have led one of
13ordinary skill in the art, through no more than ordinary creativity, to apply
14Takano’s teaching regarding improving roller face fatigue life to other machines
15wherein roller bearing wear is a problem, such as that of Tanaka.² *See KSR*, 127
16S.Ct. at 1741, 82 USPQ2d at 1396 (In making the obviousness determination one
17“can take account of the inferences and creative steps that a person of ordinary
18skill in the art would employ”).

19 The Appellants argue that their figure 4 shows that Takano’s 0.01 mm gap
20does not produce any shift in contact area but, instead, shows that the retainer and
21rolling elements remain stationary, thereby giving rise to wear problems (Reply Br.
225). That argument is not persuasive because the Appellants’ claim 1 does not
23require a shift in contact area. Additionally, the recitations in claims 17 and 18 that

29² The Appellants acknowledge that “Appellants and Tanaka are directed to the field
30of rotary elements that may be held together by clutches” (Br. 12) and that wear
31was a known problem in that type of device (Spec. 4:19-20).

1the contact position of the rolling element is shifted indicates that claim 1, from
2which claims 17 and 18 depend, encompasses roller bearings that do not provide
3the contact position shift required by those dependent claims.

4 For the above reasons we are not convinced of reversible error in the
5Examiner's rejection of claims 1-16.

6 Claims 17 and 18

7 Claim 17 depends from claim 1 and requires that "the positive value of the
8radial clearance is set such that the contact position of the rolling element with
9respect to the raceway surface of the inner ring is gradually shifted when the
10relative rotation between inner and outer rings is zero." Claim 18 depends from
11claim 1 and requires that "the positive value of the radial clearance is set such that
12the contact position of the rolling element with respect to the raceway surface of
13the inner ring is shiftable in a circumferential direction when the relative rotation
14between inner and outer rings is zero."

15 The Examiner argues that "the contact area between the raceway surface and
16the inner ring of Tanaka as modified by Iso and further modified by Takano would
17inherently shift when the forces applied to the device change due to the bearing
18clearance" (final rejection mailed June 10, 2005, p. 3), and that "it is clear that the
19contact area is gradually shifted in the reference to Takano due to the presence of
20the clearance. See gap 9" (Ans. 5).

21 An inherent characteristic must be inevitable, and not merely a possibility or
22probability. *See In re Oelrich*, 666 F.2d 578, 581, 212 USPQ 323, 326 (CCPA
231981). The Appellants provide evidence in their figure 4 that a gap of 0.01 mm
24does not provide a contact position shift. The Examiner has not provided evidence
25or technical reasoning which shows that the Appellants' evidence is incorrect or
26that there is a difference between Takano's roller bearing and that in the

1Appellants' figure 4 which causes Takano's 0.01 mm gap, unlike that in the
2Appellants' figure 4, to inevitably produce a contact position shift.

3 The Examiner, therefore, has not established a prima facie case of
4obviousness of the inventions claimed in the Appellants' claims 17 and 18.

5 DECISION

6 The rejection under 35 U.S.C. § 103 of claims 1, 9, 17 and 18 over Tanaka
7in view of Iso and Takano is affirmed as to claims 1 and 9 and reversed as to
8claims 17 and 18. The rejections under 35 U.S.C. § 103 of claims 2 and 10 over
9Tanaka in view of Iso, Takano and Brucher, claims 3 and 11 over Tanaka in view
10of Iso, Takano and Teramachi, claims 4 and 12 over Tanaka in view of Iso,
11Takano, Brucher and Teramachi, claims 5 and 13 over Tanaka in view of Iso,
12Takano and Dreschmann, claims 6 and 14 over Tanaka in view of Iso, Takano,
13Bucher and Dreschmann, claims 7 and 15 over Tanaka in view of Iso, Takano,
14Teramachi and Dreschmann, and claims 8 and 16 over Tanaka in view of Iso,
15Takano, Brucher, Teramachi and Dreschmann are affirmed.

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1 No time period for taking any subsequent action in connection with this
2appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv) (2007).

3 AFFIRMED-IN-PART

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